

From Indeterminacy to Negotiability: Mediated Musicianship in AI-Assisted Musical Theatre Composition

Chen Wang

London College of Communication
University of the Arts London
c.wang1220212@arts.ac.uk

Abstract

Generative AI introduces indeterminacy into musical practice, often understood as a source of creative openness. In constraint-intensive contexts such as musical theatre, however, generative variability must operate alongside narrative, performance, collaboration, and eventual fixation. This paper examines how openness can operate within AI-assisted musical theatre composition without compromising dramaturgical coherence. Drawing on a practice-based study of the original production *转生成为便利店* (*Reincarnated as a Convenience Store*, 2025–2026), it analyses three cases involving AI-generated musical material, collaborative interpretation, and rehearsal-driven revision. The cases suggest that, in this context, openness is better understood not as generative variability itself but as structured negotiability within the creative process. Three dimensions are identified: communicative openness, interpretive openness, and structural openness. Together, they provide a framework for understanding mediated musicianship and distributed agency in AI-assisted composition, showing how human judgement, collaborative expertise, and generative systems can remain negotiable within a highly structured creative process.

1 INTRODUCTION

Contemporary generative AI in music composition introduces a form of indeterminacy in which probabilistic systems produce outputs that vary across generations, resist full prediction, and do not always correspond precisely to compositional intent. In more open-ended creative contexts, such unpredictability has been productively understood as a resource for serendipitous discovery, emergent direction, and iterative exploration (Browne, 2025; Ford & Bryan-Kinns, 2022; Oyeniyi & Oyeniyi, 2025). As AI music generation expands the range of musical possibilities available to composers, it also raises questions about compositional agency when significant aspects of musical material emerge beyond direct authorial control.

Questions of indeterminacy and openness in music also recall Umberto Eco's concept of the open work, first articulated in *Opera aperta* (Eco, 1962/1989), in which structured possibilities remain available for interpretation and realisation rather than being fully fixed in advance. Generative AI creates a different but related condition in which unexpected musical directions and emergent choices may arise through variation between outputs. Across music-making more broadly, such systems have opened new possibilities for composition, production, and experimentation (Vengathattil, 2025; Yang et al., 2024). Their role in musical theatre composition, however, remains comparatively underexamined, particularly where music must operate within tightly coordinated dramatic and production requirements (Collins, 2016; Horváth, 2025; Huang-Kokina, 2024).

Musical theatre places composition within a collaborative system in which musical decisions interact closely with

narrative development, character, lyrics, staging, performance, and production (Mallett, 2018; McHugh, 2015). Musical material therefore has to respond not only to compositional aims but also to shared dramaturgical and practical requirements. These conditions create what might be understood as constraint-intensive creativity: creative development within a structured framework of interdependent decisions rather than through unrestricted exploration. In such a context, generative variability may provide useful alternatives, but it can also become an obstacle when outputs fail to align with dramatic function, performance needs, or collaborative intentions. Whether indeterminacy becomes creatively productive therefore depends partly on how the interaction between generative systems and human collaborators is structured.

This raises a central question for AI-assisted composition: if generative AI introduces variability, unpredictability, and partial loss of direct control, how can those qualities operate within a context that also depends on precision, coordination, and shared authorship? More specifically, how can a compositional process remain responsive to multiple forms of creative input while still moving towards a coherent and repeatable theatrical work?

Rather than assuming that generative variability itself constitutes openness, this paper examines openness through the negotiability of compositional decisions: whether and how musical material can remain revisable, responsive to different forms of expertise, and open to redirection during production. From this perspective, a highly structured process may still sustain openness, while extensive generative variation may offer little meaningful openness if collaborators have limited means of shaping its consequences. The central issue therefore becomes not the amount of variation produced, but how

generative possibilities are organised through human judgement, collaboration, and constraint.

The research question is consequently practical: how can negotiability operate within human–AI co-creation in the constraint-intensive context of musical theatre, and what compositional or interaction strategies enable it? The study does not begin from the assumption that openness is an inherent property of AI-assisted composition. Instead, it investigates how different forms of negotiability became visible through the documented development of a specific production.

The investigation draws on a practice-based study of *Reincarnated as a Convenience Store* (转生成为便利店, 2025–2026), a full-length musical theatre production developed through AI-assisted compositional methods. Across three compositional cases, the paper examines how decisions remained negotiable even though the final musical work ultimately became fixed, rehearsed, and staged. From these cases, three analytically distinct dimensions are identified: communicative openness, concerning who can influence musical development; interpretive openness, concerning what forms of knowledge can become compositionally operative; and structural openness, concerning when substantive revision remains possible. Together, these dimensions form a framework of structured negotiability through which openness can be examined as a property of the creative process rather than simply of generative output.

2 THEORETICAL CONTEXT

2.1 Indeterminacy and Generative AI in Music

Indeterminacy has been explored across a range of compositional practices in which variability is embedded within structured systems. Early procedural approaches, including the *Musikalisches Würfelspiel* attributed to Mozart (1792) and Cage’s use of the *I Ching* (Legge, 1963), demonstrate how unpredictability can be deliberately organised, allowing multiple outcomes to emerge without abandoning formal coherence (Bandt, 1974). Contemporary AI music generation extends this lineage through a new form of structured variability, using probabilistic inference over large datasets to produce outputs that are stylistically plausible yet variable across iterations (Ford et al., 2024).

Within creative practice, this variability operates ambivalently. On one hand, unpredictable outputs can support serendipitous discovery, disrupt habitual patterns, and introduce unexpected directions into the compositional process (Caramiaux & Donnarumma, 2021; Ford & Bryan-Kinns, 2022). On the other hand, they can introduce practical and conceptual challenges. Nondeterministic outputs can make it difficult to achieve specific artistic intentions reliably, while the abundance of generated alternatives can overwhelm decision-making (Louie et al., 2020). More critically, many current generative music systems rely on interaction models based largely on textual prompting followed by generated output, offering limited visibility into how human intentions are interpreted and translated into musical form. Hu et al. (2025, p. 1) describe this as a “knowing–doing gap.” Composers may begin with layered and tacit intentions, including emotional trajectories, character development, and dramaturgical nuance, that cannot be fully specified through short textual prompts. In

responding to these prompts, the AI system makes numerous interpretive decisions, such as mapping abstract descriptors like “melancholic” or “intense” onto concrete musical parameters, yet these processes remain inaccessible to the user. Hu et al. (2025, p. 2) describe the resulting imbalance as an “interpretive monopoly”: users can evaluate generated outputs but have limited means of interrogating or redirecting how their intentions have been interpreted. Generative variability may therefore expand the range of available outcomes without necessarily increasing meaningful human influence over the interpretive process.

2.2 Human–AI Co-Creativity and Distributed Agency

Human–AI co-creativity considers how creative outcomes can emerge through interaction between human and computational contributions rather than through human activity alone (Davis, 2013; Singh et al., 2025). Research in this area has argued that such interaction can produce unexpected possibilities that neither participant would necessarily generate independently (Haase & Pokutta, 2026; Liapis et al., 2014; Singh et al., 2025). From this perspective, creative agency is not located exclusively in a single author but may be distributed across the wider collaborative process.

Research has also documented shifts in how composers experience their own role within such collaborations. Suh et al. (2021) found that participants in AI-assisted composition could experience a shift from active creator towards curator, evaluating generated material rather than developing all musical ideas directly, which in some cases weakened their sense of creative involvement. Civit et al. (2022) similarly observed that composers working with AI described themselves as arrangers selecting from machine-generated options. Previous practice-based work has described AI-assisted composition as an iterative exchange in which the composer moves from sole author towards a curatorial and facilitative role, shaping and recontextualising emergent material rather than simply originating it (Wang, 2025). These accounts suggest that agency does not necessarily disappear in human–AI collaboration but may be redistributed. Depending on how the collaboration is structured, this redistribution can be experienced either as a loss of creative involvement or as a reorientation of compositional practice.

Shneiderman’s (2022) framework of Human-Centered AI suggests that such relationships are most productive when AI augments rather than replaces human capabilities, expanding the range of available options while retaining meaningful human judgement and direction. This places emphasis on the design of the interaction rather than on AI autonomy itself: how constraints are established, how generated possibilities are evaluated and redirected, and how different contributors participate in shared creative decisions (Serra Segarra, 2023). This literature therefore shifts attention from the quantity or autonomy of AI-generated material towards the interaction structures through which human judgement, direction, and collaboration remain operative.

2.3 Musical Theatre as Constraint-Intensive Collaboration

Musical theatre composition operates within collaborative and dramaturgical conditions that differ from many forms of autonomous composition. Music is closely tied to dramatic function, including narrative development, character motivation, staging, and the collective aims of the production (Baston, 2008; Taylor, 2012). Mallett (2018, p. 43) describes this shift as moving “from an autonomous decision-making process to the fusion of ideas under a shared aesthetic, the consideration of a more complex set of constraints and parameters.” Composition in this context therefore develops through negotiation with other creative disciplines rather than according to the composer’s musical intentions alone.

Salzman and Desi (2008, p. 320) describe music theatre through the “overlapping of several systems of expression,” emphasising the interaction of multiple creative forms within theatrical production. Musical material therefore develops in relation to dramaturgical requirements, staging practicalities, textual development, and the interpretive contributions of performers. These conditions can create friction with indeterminacy, particularly when unpredictable or context-insensitive outputs conflict with requirements for dramatic precision, coordination, and performability. The challenge is therefore not simply whether variability can be generated, but whether it can remain responsive to the wider theatrical system in which the music must function.

Despite the rapid expansion of AI-assisted music production, its application within musical theatre composition remains comparatively underexamined (Collins, 2016; Huang-Kokina, 2024). Existing work includes experimental and adjacent applications such as AI-assisted scriptwriting (Mirowski et al., 2022), algorithmic composition for musical theatre (Collins, 2016), and AI-mediated or interactive opera (Huang-Kokina, 2024; Jalhed et al., 2022). This limited body of work points to a practical tension: general-purpose generative music systems are not typically designed around the dramaturgical, collaborative, and production requirements that shape musical theatre. Musical theatre therefore provides a useful context in which to examine how generative variability can be negotiated within a highly interdependent creative process.

3 METHODOLOGY

This study adopts a practice-based research framework, using the compositional process of *Reincarnated as a Convenience Store* as the primary site of investigation. I served as both composer and music producer, taking responsibility for the composition, development, and production of its musical material while working with the director, scriptwriter/lyricist, performers, and sound designer. I attended rehearsals regularly, revising compositions, arrangements, and production decisions in response to performance, staging, and dramaturgical development. The production was developed between April 2025 and January 2026 and comprised fourteen original songs with a total musical running time of approximately two hours. The narrative is set in a technologically mediated future world and explores themes of memory, identity, and human-machine entanglement.

The analysis draws on documentation maintained throughout the creative process, including AI prompts and iterative refinements; generated demos marking

significant decision points; DAW project files documenting editing and restructuring; recorded collaborative discussions and feedback; and lyrical revision histories documenting reciprocal influence between musical and textual development. These materials were used to trace how compositional decisions developed and changed throughout the production, alongside practitioner reflection. This allowed the analysis to remain grounded in contemporaneous documentation rather than relying solely on retrospective recollection.

The project was not initially conceived as an investigation of openness. At the outset, I understood the production process as almost the opposite of an open work: the musical ultimately had to become fixed, rehearsed, repeatable, and coordinated across performance and staging. However, as I documented and reflected on the AI-assisted compositional process, I began to recognise recurring situations in which musical decisions remained provisional and could be redirected through collaboration, interpretation, and rehearsal. Openness therefore emerged as an analytical concern from the practice itself rather than as a framework imposed in advance.

The three cases were selected retrospectively because each makes one of these recurring dynamics particularly visible. They should not be understood as examples in which communicative, interpretive, or structural openness occurred independently. Across the wider production, these modes appeared in different combinations and degrees. The selected cases foreground moments in which one dimension became particularly clear: AI-generated demos facilitating communication between collaborators; embodied interpretation becoming compositional input; and rehearsal-stage knowledge producing substantive structural revision. Comparing these cases provided the basis for distinguishing communicative, interpretive, and structural openness as interconnected dimensions of negotiability.

The AI tools employed included commercially available text-to-music generation platforms, primarily Suno AI (Suno, 2025), capable of producing complete audio tracks from textual prompts and processing uploaded audio references as generative inputs. AI-generated outputs served different functions across the process, including exploratory demos, melodic material, structural references, and arrangement alternatives. Human collaborators contributed dramaturgical, lyrical, directorial, and performative knowledge, while generated alternatives were evaluated in relation to narrative function, emotional trajectory, staging, and performability. As composer and producer, I curated, edited, restructured, and combined generated material within a digital audio workstation before further collaborative review. The workflow was cyclical: generated material could be evaluated, manually revised, re-uploaded as reference, and used to steer subsequent development.

4 CASE ANALYSES

This section presents three cases drawn from the musical theatre production, each foregrounding a different way in which openness became visible through the compositional process. The cases are not treated simply as illustrations of an existing framework, but as the primary practice-based evidence through which the dimensions of

communicative, interpretive, and structural openness are developed and examined.

The accompanying video (Figure 1) provides an overview of the compositional workflow and documents how AI-assisted musical material was developed in relation to dramaturgical and production requirements. While the video focuses on specific examples, the processes it presents correspond to broader patterns examined across the three cases.



Figure 1 Video documentation of the compositional process for *Reincarnated as a Convenience Store*, illustrating AI-assisted workflow from initial generation to the development of dramatic musical structure. The material shown corresponds to stages discussed across the following case analyses. [\[Video documentation\]](#)

4.1 Case 1: AI as Communicative Medium in Early Co-Development

The condition motivating this case was a structural feature of early production. Between April and June 2025, the script existed largely as an outline: character arcs and thematic directions had been proposed, but individual scenes, lyrics, and aspects of staging remained under development. Musical theatre composition often assumes a broadly sequential relationship between script and score, in which dramatic material provides the basis from which music develops. Under these circumstances, however, waiting for the dramatic material to become fully established would have limited the possibility for music to contribute to the development of the work itself.

I therefore used AI-generated demos not primarily as drafts moving towards a finished score, but as communicative and exploratory musical proposals. For anticipated dramatic moments, I developed contrasting musical directions and used AI generation to realise them as production-complete demos containing vocals, harmony, instrumentation, arrangement, and production. Their production completeness was significant because the director and scriptwriter could respond directly to qualities such as musical energy, pacing, atmosphere, and dramatic potential without needing to translate those responses into technical musical vocabulary. In this sense, the demos functioned as what Star and Griesemer (1989) describe as boundary objects: shared artefacts that could be approached through different forms of expertise while remaining concrete enough to support collaborative decision-making.

The development of the song “同一支球队” (The Same

Team) provides a particularly clear example. An earlier musical version had established a melody and an energetic musical character that the collaborators responded positively to. Although there was a shared sense that the melody and energy were effective, the demo did not yet serve the developing narrative or the director's approach to stage presentation. As the script developed, the dramatic function of the song changed substantially. The song came to carry several stages of narrative development, beginning with a stadium encounter and moving through collaboration, conflict, the collapse of memory, and an alternative ending. These dramatic stages also involved shifts between different locations, times, and forms of stage presentation.

The scriptwriter clarified the function of each part of the song within the developing story, including what narrative information and character development needed to occur as the number progressed. The director contributed a complementary perspective, describing the pacing of the scene, the rhythm of its stage presentation, and how transitions between the stadium, memories, different locations, and different temporal spaces should be experienced theatrically. I then translated these dramaturgical and directorial requirements into musical structure. As documented in the accompanying video, the song was organised around five functional sections: stadium encounter, collaboration, conflict, memory collapse, and alternative ending. The retained melody was reinterpreted across these sections rather than simply repeated, allowing changes in arrangement, density, pacing, and production to support their different dramatic functions. Elements of the melody were also transformed into a recurring sound-design motif that helped signal transitions in time and space across the composition.

AI-assisted generation was used within this process to explore and realise musical possibilities around these developing structures, while I selected, restructured, arranged, and produced the resulting material in relation to the dramatic sequence. The video documentation therefore provides a trace of how an initially valued musical idea was retained while its structural and dramaturgical role was progressively reworked. What remained relatively stable was the melodic identity; what remained negotiable was how that material functioned across narrative, arrangement, sound design, and stage presentation.

The influence, however, did not operate only from script and staging towards music. Once revised musical versions were available, their pacing, transitions, and structural development gave the scriptwriter and director new material to respond to. The script and stage presentation were subsequently adjusted in relation to what the music suggested or made possible, while those changes in turn led to further musical revisions. The process therefore developed recursively: dramaturgical requirements redirected the music, while the developing music also reshaped subsequent decisions about narrative and presentation. Neither text nor score held consistent priority throughout the process.

Reflecting on this process made communicative openness visible not simply as the exchange of feedback, but as a widening of who could meaningfully influence musical development and through what means. The production-complete demos gave collaborators a concrete musical artefact through which dramaturgical, lyrical, and

directorial expertise could become formative in the compositional process. The director and scriptwriter did not need to compose the music themselves in order to shape its development; their responses to its energy, pacing, narrative possibilities, and relationship to staging became inputs into subsequent musical decisions.

AI's contribution in this case was therefore not simply the generation of musical content. Its particular value lay in making sufficiently developed musical propositions available quickly enough for them to enter an ongoing collaborative exchange while the script, staging, and score were still being formed. Communicative openness emerged from this participation structure: music functioned not only as an outcome of dramatic development, but also as a medium through which that development could be discussed, tested, and revised.

4.2 Case 2: From Spoken Monologue Performance to Melody: Interpretation as Compositional Input

This case is defined by a constraint of a different kind: not the absence of dramatic material, but the difficulty of communicating interpretive knowledge through verbal discussion and textual prompting alone. The composition in question was a ballad functioning as the emotional climax of a central character's arc, in which a mother realises that she has subordinated her identity entirely to maternal responsibility and must begin to reclaim an autonomous sense of self. The lyrics, written by the scriptwriter, followed a precise emotional trajectory: self-mockery giving way to confusion, expanding towards existential recognition, and resolving into transformed self-understanding. The compositional requirement was therefore not simply to represent "sadness" or "strength," but to shape the melody around a sequence of mixed and shifting emotional states, each requiring particular pacing, intensity, and timing within the scene.

Despite multiple compositional attempts over several weeks, the melodic settings remained unsatisfactory. The scriptwriter's feedback, including descriptions such as "flat," "not touching," or "not there yet," communicated that something was missing but did not provide directly actionable musical information. Further technical revision and repeated prompting with descriptors such as "more emotion" or "greater vulnerability" produced different outputs, but did not resolve the problem. The difficulty was that the desired interpretation depended on several interrelated elements at once: emotional tone, pacing, pauses, emphasis, breath, dynamic intensity, and the timing of transitions between different feelings. Describing these elements separately through discussion or prompts increased the amount of explanation required without necessarily communicating how they should work together in performance. What became increasingly clear was an interpretive gap between collaborators: the scriptwriter held an embodied understanding of how the

character's emotional trajectory should unfold, but this could not be fully expressed through verbal description or compressed into a textual prompt.

At this point, I realised that the problem was not simply how to describe the intended emotion more precisely, but how to preserve the scriptwriter's own expressive interpretation as compositional information. I therefore asked the scriptwriter to record himself reading the lyrics aloud as a dramatic monologue rather than singing them. His performance carried information through pacing, emphasis, pauses, breath, and dynamic contour that had been difficult to communicate verbally. I then used this recording alongside the lyrics as an audio reference for AI-assisted generation, instructing the system to follow the spoken phrasing, pauses, breath patterns, and emotional pacing when developing the melodic setting.¹

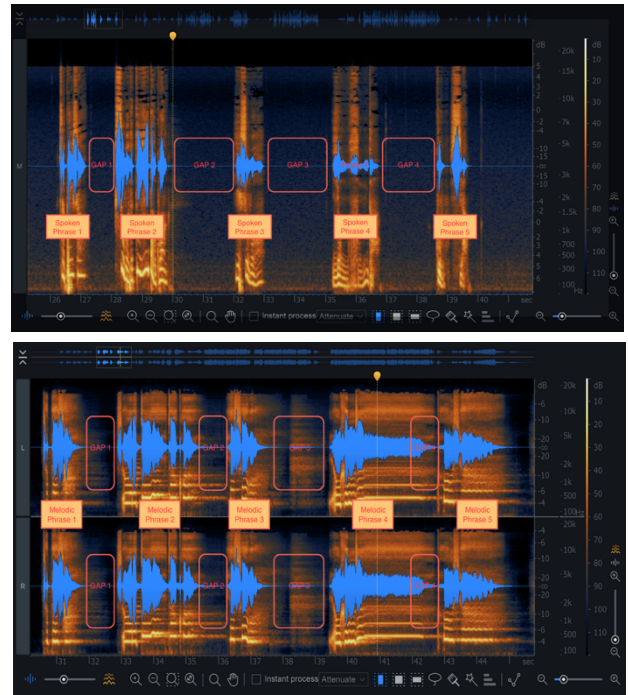


Figure 2 Comparative waveform and spectrogram analysis of spoken (top image) and AI-generated (bottom image) vocal recordings, showing phrase segmentation and pause alignment.

The resulting outputs were qualitatively different from the previous attempts. The comparison presented in Figure 2 provides a concrete trace of this change. Five identifiable phrases in the spoken performance, separated by prosodic pauses, corresponded closely with the phrase segmentation of the generated vocal version. Pauses in the spoken delivery became melodic boundaries, while moments of emphasis were reflected through changes in pitch, duration, or rhythmic placement. This correspondence does not demonstrate that the AI system understood the semantic or emotional meaning of the

¹ Prompt used for AI generation: "Transform the uploaded spoken reference into a sung emotional power ballad. Use the spoken delivery as the guide for phrasing, pauses, breath, and emotional pacing. Let the melody grow naturally from the speech rhythm, respecting its breaks and intensity. Style: dramatic, confessional ballad. Begin with soft, trembling vocals over warm piano and very light strings, intimate and restrained. Build gradually through the pre-chorus with rising harmonic tension. The chorus should lift into strong, soulful singing with raw vulnerability, theatrical but not pop-like. The bridge is the emotional breaking point: darker, defiant, and intense, with cinematic harmonic pressure. The final chorus should feel fierce, cathartic, and resolute, with sustained open vowels and a clear emotional arrival. Overall tone: tragic, intimate, and deeply human. Let the music serve the text."

performance. Rather, it shows that aspects of the spoken performance's temporal and dynamic organisation were carried into the generated melodic structure. The scriptwriter subsequently described the result as “accurate”, indicating that the generated setting captured an emotional trajectory that previous attempts had failed to achieve.

Reflecting on this process made interpretive openness visible as the capacity for tacit or embodied creative knowledge to become formative within compositional development. When interaction relied mainly on verbal discussion and textual prompting, the scriptwriter's interpretation had to be reduced to abstract descriptors. The spoken monologue introduced another mode of input through which pacing, emphasis, breath, and emotional timing could enter the compositional process more directly.

AI's role here was therefore different from its role in Case 1. Rather than primarily providing production-complete musical propositions for collaborative discussion, its generative capacity was structured around a form of cross-modal translation: temporal and dynamic information encoded in spoken performance became a basis for melodic generation. The significance lies not in removing the interpretive gap between collaborators, but in creating a means through which embodied dramaturgical knowledge could exert a more direct influence on musical structure.

4.3 Case 3: Rehearsal-Driven Revision

Musical theatre production tends towards progressive fixation as rehearsals advance. Staging becomes more established, performers internalise specific musical material, and production decisions increasingly depend on one another. As these interdependencies accumulate, substantial structural revision becomes progressively more difficult, even when new insights emerge through rehearsal. In this production, rehearsal therefore became an important point of tension between the need for stability and the possibility of continued compositional change.

The song “*Eighteen Forty-Five*” had initially been composed as a metrically stable 4/4 ballad with a steady *moderato* pulse. During rehearsal, however, the performing actress felt that this rhythmic continuity did not fully reflect the character's changing emotional state. Through repeated engagement with the role, she understood the character as moving between sadness, accusation, and collapse in ways that a single stable metrical framework did not adequately support. Her suggestion concerned not simply expressive interpretation within the existing music, but the musical structure itself. She proposed reworking the chorus in 6/8 and demonstrated the idea at the rehearsal-room piano. The director supported the change on dramaturgical grounds, recognising that the change from 4/4 to 6/8 could help differentiate the character's shifts between sadness, accusation, and collapse. Rehearsal was therefore contributing structural knowledge to the composition rather than only shaping its performance.

Implementing the change created a practical problem. The revised song required repeated alternation between 4/4 and 6/8 sections while maintaining continuity of melody and arrangement. I initially used AI generation to explore this structure directly, but repeated attempts did not

reliably maintain the required metric changes within a single generation. Rather than continuing to ask the system to originate the temporal structure, I redesigned the workflow around a human-established reference.

I recorded a dry vocal track with metronome guidance, explicitly performing the required 4/4 and 6/8 changes. This recording was then uploaded as a structural reference for subsequent AI-assisted generation. The role of the system was therefore narrowed: the temporal organisation had already been established through human performance, while AI was used to explore arrangement and production possibilities around that structure. The resulting alternatives varied in the treatment of metric transitions, instrumentation, density, and dramatic intensity, and could then be evaluated in relation to both staging practicality and the actress's interpretation.

This process allowed a rehearsal-stage insight to produce substantive musical change at a point when producing and testing several alternative arrangements manually would have been considerably more time-consuming. The final solution did not depend on AI successfully generating the metric structure independently. Instead, human performance established the constraint that the system had struggled to maintain, while AI-assisted generation accelerated the exploration of musical possibilities within that constraint.

Reflecting on this case makes structural openness visible as the continuation of meaningful compositional revision into a later stage of production. Openness here did not mean leaving the final work unfixed. The song ultimately still had to become stable enough to rehearse and perform. Rather, the AI-assisted workflow extended the practical period during which knowledge emerging from rehearsal could still alter musical structure, rather than being limited to interpretive adjustment within an already fixed score.

5. DISCUSSION

5.1 From Indeterminacy to Negotiability

The three cases suggest that, in this production, openness did not primarily arise from generative variability. AI tools produced abundant melodic, structural, and production alternatives, and this multiplicity was useful in expanding the range of possibilities available during composition. However, variation alone did not necessarily support meaningful creative development. Whether that multiplicity became creative openness or an obstacle depended on how the interaction was structured. What became productive was structured negotiation: generative possibilities were proposed, evaluated, revised, and redirected according to dramaturgical, performative, and collaborative requirements.

This shifts the emphasis from AI indeterminacy itself to the conditions through which that indeterminacy becomes compositionally useful. The cases suggest that openness emerges through the relationship between generative possibility and human judgement and collaboration: how constraints are established, how alternatives are evaluated, how collaborative authority is distributed, and how decisions remain open to revision. From this perspective, generative multiplicity becomes meaningful not through unpredictability alone, but through its organisation as structured negotiability.

5.2 Three Dimensions of Structured Negotiability

Across the three cases, openness operated through three analytically distinct but interconnected dimensions of structured negotiability. Communicative openness concerns who can intervene in musical development; interpretive openness concerns what forms of knowledge can become compositionally operative; and structural openness concerns when substantive intervention remains possible. These dimensions remained analytically distinct even when they co-occurred within the same compositional situation, with each identifying a different axis along which decisions remained negotiable. Table 1 summarises these distinctions and the specific role AI played in each case.

Table 1. Three dimensions of structured negotiability.

Communicative openness	
Central question	Who can intervene?
Mechanism	Shared, production-complete artefacts let non-musician expertise shape the music
Case	Case 1: Communicative co-development
AI's role	Rapidly realises complete musical propositions for collaborative evaluation
Interpretive openness	
Central question	What forms of knowledge can intervene?
Mechanism	Tacit, embodied interpretation becomes compositionally operative across modalities
Case	Case 2: Spoken monologue to melody
AI's role	Translates temporal-dynamic features of spoken performance into melodic material
Structural openness	
Central question	When can intervention still alter the work?
Mechanism	The window for substantive revision extends into rehearsal
Case	Case 3: Rehearsal-driven metric revision
AI's role	Generates arrangement alternatives within a human-defined structure

Communicative openness concerns participation in musical decision-making. In Case 1, production-complete demos provided a shared musical artefact through which the director and scriptwriter could contribute dramaturgical, lyrical, and directorial expertise without requiring a shared technical musical vocabulary. Their responses could then shape subsequent compositional development. The key issue is therefore not simply the generation of more alternatives, but the conditions through which different collaborators can meaningfully influence musical decisions.

Interpretive openness concerns what kinds of creative knowledge can enter the compositional process. In Case 2, the spoken monologue allowed pacing, emphasis, breath, and dynamic contour that had been difficult to communicate through verbal description or textual prompting to become formative in melodic generation.

Interpretive openness therefore concerns the movement of creative knowledge across expressive modalities, allowing embodied interpretation developed in one domain to become consequential in another.

Structural openness concerns when substantive compositional change remains practically possible. In Case 3, knowledge emerging through rehearsal was able to alter the musical structure rather than being confined to interpretation within an already fixed version. The AI-assisted workflow extended the practical period during which structural alternatives could still be produced and evaluated, while the song ultimately continued towards a fixed performance version. Structural openness therefore describes the temporal extension of negotiability rather than the avoidance of eventual fixation.

5.3 Mediated Musicianship and Distributed Agency

Together, the three dimensions suggest a reframing of AI's role within the collaborative process examined here. Rather than functioning as an autonomous creative agent, AI operated as a form of mediation through which musical possibilities could be generated, translated, shared, and revised across collaborators with different forms of expertise. Its generative capacity expanded the range of available options, but the significance of those options depended on how they were shaped through dramaturgical judgement, performance knowledge, collaborative feedback, and compositional decision-making.

This also reframes the composer's role within human-AI collaboration. The literature frequently describes a shift from creator to curator, sometimes associating curation with a reduced sense of authorship. In this project, however, I experienced curation as part of the compositional work itself rather than as passive selection from AI-generated alternatives. Generated materials were compared in relation to dramatic function, emotional pacing, performability, and staging; useful elements were edited, restructured, combined, or discarded; and revised material was repeatedly used to redirect subsequent generation. Compositional agency therefore did not disappear, but increasingly operated through the design of constraints, evaluative judgement, editing, recontextualisation, and iterative steering.

Agency was also distributed without becoming equivalent across participants. The composer, director, scriptwriter, and performers contributed different forms of knowledge and authority, while the AI system generated possibilities within the conditions established through those human decisions. Case 1 foregrounded dramaturgical and directorial participation in musical development; Case 2 enabled embodied interpretation to become compositional input; and Case 3 allowed rehearsal-stage knowledge to reshape musical structure. Distributed agency in this context therefore describes the movement of compositional influence across different participants and forms of expertise, rather than an equal distribution of authorship.

The workflow also offers a partial response to the problem of interpretive monopoly identified in the literature. The internal logic through which the AI system interpreted prompts and reference material remained inaccessible, but its outputs could be contested and redirected through comparison, edited references, embodied input, and repeated iteration. These practices did not make the

system's interpretation transparent; instead, they created practical means of negotiating its consequences. In this sense, AI reconfigured rather than replaced compositional agency, while mediated musicianship increasingly involved designing and managing the conditions through which different forms of human and computational contribution could shape the developing work.

5.4 Extending Eco: From Open Work to Open Process

The theoretical implications of this study can be further considered through Umberto Eco's concept of the open work, originally developed in *Opera aperta* (Eco, 1962/1989). For Eco, openness does not imply disorder or the absence of form. Rather, an open work is structured so that a field of possible interpretations or realisations remains available to the reader, performer, or interpreter. Openness is therefore framed and bounded by the organisation of the work itself: interpretation takes place within possibilities that have been deliberately made available rather than through unrestricted freedom.

This framework is useful for understanding the present study, but the cases shift attention to a different site of openness. The musical produced through this project ultimately became fixed, rehearsed, and repeatable for performance; it was therefore not an open work in Eco's conventional sense. Yet the process through which that musical form emerged remained negotiable for an extended period. Musical materials were revised through exchanges between composition, script development, direction, performance, and rehearsal, while AI-assisted workflows enabled different forms of input to continue influencing the work before fixation.

The extension proposed here is therefore a relocation of emphasis: from openness primarily as a property of the artefact to openness as a property of the collaborative production process. In the production examined here, openness was not principally located in the finished work's capacity to sustain multiple realisations, but in the conditions through which the work was developed. Provisional materials remained revisable, different forms of expertise could influence compositional decisions, and structural change remained possible until relatively late in production. The final work could therefore be comparatively closed while the process that produced it remained open.

This distinction changes the question posed to AI-assisted composition. Rather than asking only whether AI produces works that remain open after completion, the cases examined here suggest asking whether AI can help sustain conditions in which compositional decisions remain negotiable, shared, and revisable during their development. Judged only at the level of the finished artefact, the production examined here could appear incompatible with openness because its musical form ultimately had to be stabilised; shifting attention to process reveals that openness may instead reside in how that stability is reached. In this project, AI's contribution lay in making musical possibilities available quickly enough to be tested, revised, and circulated among collaborators while the work was still taking shape. AI did not generate an open work in Eco's sense; it helped sustain an open process through which a fixed collaborative work could emerge.

6. CONCLUSION

This paper examined how openness can operate in AI-assisted musical theatre under conditions that require dramaturgical coherence, collaboration, rehearsal, and eventual fixation. Across the production examined here, generative variability became creatively useful not by simply embracing unpredictability, but by organising it through structured negotiability: musical possibilities could be proposed, evaluated, revised, and redirected in relation to shared dramatic, performative, and collaborative requirements.

The three dimensions developed from the cases identify different axes of this negotiability. Communicative openness concerns who can influence musical development; interpretive openness concerns what forms of knowledge can become compositionally operative; and structural openness concerns when substantive change remains practically possible. Together, they suggest that openness in this context is less a property of generative output than a property of how the creative process is organised. Constraints are not the opposite of openness; they are its condition of possibility. They provide the framework through which generative multiplicity can become meaningful, revisable, and collaborative.

The broader implication suggested by this study is that the value of generative AI in collaborative composition need not lie in maximising autonomy or preserving indeterminacy in the finished work. In this project, its significance lay in helping sustain an open process long enough for different forms of expertise to shape the music before fixation. Musical theatre therefore provides a revealing context for understanding mediated musicianship as the design of conditions through which human and computational contributions can remain negotiable. Those contributions can nevertheless converge towards a coherent final work.

REFERENCES

- Bandt, R. (1974). *Chance operations and indeterminate procedures in the work of John Cage, 1950–1970* [M.A. preliminary thesis, Monash University].
<https://doi.org/10.26180/5bec99311be71>
- Baston, K. (2008). *Scoring performance: The function of music in contemporary theatre and circus* [Doctoral dissertation, La Trobe University].
<https://doi.org/10.26181/21856038.v1>
- Browne, E. (2025). The shape of surprise: Structured uncertainty and co-creativity in AI music tools [Conference paper]. *The AI Music Creativity Conference (AIMC), Brussels, Belgium*.
<https://doi.org/10.5281/zenodo.16946685>
- Caramiaux, B., & Donnarumma, M. (2021). Artificial intelligence in music and performance: A subjective art-research inquiry. In E. R. Miranda (Ed.), *Handbook of artificial intelligence for music: Foundations, advanced approaches, and developments for creativity* (pp. 75–95). Springer.
https://doi.org/10.1007/978-3-030-72116-9_4
- Civit, M., Civit-Masot, J., Cuadrado, F., & Escalona, M. J. (2022). A systematic review of artificial intelligence-based music generation: Scope, applications, and future trends. *Expert Systems with Applications*, 209, 118190.

- <https://doi.org/10.1016/j.eswa.2022.118190>
- Collins, N. (2016). A funny thing happened on the way to the formula: Algorithmic composition for musical theater. *Computer Music Journal*, 40(3), 41–57. https://doi.org/10.1162/COMJ_a_00373
- Davis, N. (2013). Human-computer co-creativity: Blending human and computational creativity. *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*, 9(6), 9–12. <https://doi.org/10.1609/aiide.v9i6.12603>
- Eco, U. (1989). *The open work* (A. Cancogni, Trans.). Harvard University Press. (Original work published 1962)
- Ford, C., & Bryan-Kinns, N. (2022). Speculating on reflection and people's music co-creation with AI. In *Generative AI and HCI Workshop at CHI 2022*.
- Ford, C., Noel-Hirst, A., Cardinale, S., Loth, J., Sarmiento, P., Wilson, E., Wolstanholme, L., Worrall, K., & Bryan-Kinns, N. (2024). Reflection across AI-based music composition. In *Proceedings of the 16th Conference on Creativity & Cognition* (pp. 398–412). Association for Computing Machinery. <https://doi.org/10.1145/3635636.3656185>
- Haase, J., & Pokutta, S. (2026). Human–AI cocreativity: Exploring synergies across levels of creative collaboration. In M. J. Worwood & J. C. Kaufman (Eds.), *Generative artificial intelligence and creativity* (pp. 205–221). Academic Press. <https://doi.org/10.1016/B978-0-443-34073-4.00009-5>
- Horváth, D. (2025). Curtain call for AI: Transforming theatre through technology. *Sustainable Futures*, 9, 100747. <https://doi.org/10.1016/j.sfr.2025.100747>
- Hu, Z., Liu, Y., Zhang, Z., Chen, G., Yu, B. X. B., & Cao, J. (2025). *Who decides how knowing becomes doing? Redistributing authority in human–AI music co-creation* [Preprint]. arXiv. <https://doi.org/10.48550/arXiv.2509.10331>
- Huang-Kokina, A. (2024). Creative artificial intelligence for music theatre: AI mediation and artificial–human co-creativity in contemporary science-fiction opera. *Performance Research*, 29(6), 145–152. <https://doi.org/10.1080/13528165.2024.2537573>
- Jalhed, H., Rylander, M., Åberg, K., & Hornwall, D. (2022). *The Oracle: A prototype* [Artistic work]. Mälardalen University. <https://urn.kb.se/resolve?urn=urn:nbn:se:mdh:diva-61678>
- Legge, J. (Trans.). (1963). *The I Ching: The book of changes*. Dover Publications.
- Liapis, A., Yannakakis, G. N., & Togelius, J. (2014). Computational game creativity. In *Proceedings of the Fifth International Conference on Computational Creativity* (pp. 46–53). <https://www.um.edu.mt/library/oar/handle/123456789/29473>
- Louie, R., Coenen, A., Huang, C. Z., Terry, M., & Cai, C. J. (2020). Novice-AI music co-creation via AI-steering tools for deep generative models. In *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems* (pp. 1–13). Association for Computing Machinery. <https://doi.org/10.1145/3313831.3376739>
- Mallett, A. (2018). *Composing for musical theatre: Approaches to interdisciplinary collaboration* [Doctoral dissertation, Bath Spa University]. <https://doi.org/10.17870/bathspa.00011591>
- McHugh, D. (2015). “I’ll never know exactly who did what”: Broadway composers as musical collaborators. *Journal of the American Musicological Society*, 68(3), 605–652. <https://doi.org/10.1525/jams.2015.68.3.605>
- Mirowski, P., Mathewson, K. W., Pittman, J., & Evans, R. (2022). Co-writing screenplays and theatre scripts alongside language models using Dramatron. In *Machine Learning for Creativity and Design at the 36th Conference on Neural Information Processing Systems (NeurIPS 2022)*.
- Mozart, W. A. (1792). Musikalisches Würfelspiel [Musical dice game].
- Oyeniya, G. A., & Oyeniya, J. A. (2025). *Artificial intelligence in music composition and performance*. Zenodo. <https://doi.org/10.5281/zenodo.17071643>
- Salzman, E., & Desi, T. (2008). *The new music theater: Seeing the voice, hearing the body*. Oxford University Press.
- Serra Segarra, G. (2023). *Design material as a shared language: Exploring human–AI co-creation to augment creativity* [Doctoral dissertation, Universitat Ramon Llull]. TDX (Tesis Doctorals en Xarxa). <https://www.tdx.cat/handle/10803/689193>
- Shneiderman, B. (2022). *Human-centered AI*. Oxford University Press. <https://doi.org/10.1093/oso/9780192845290.001.0001>
- Singh, S., Hindriks, K., Heylen, D., & Baraka, K. (2025). *A systematic review of human–AI co-creativity* [Preprint]. arXiv. <https://doi.org/10.48550/arXiv.2506.21333>
- Star, S. L., & Griesemer, J. R. (1989). Institutional ecology, “translations” and boundary objects: Amateurs and professionals in Berkeley’s Museum of Vertebrate Zoology, 1907–39. *Social Studies of Science*, 19(3), 387–420. <https://doi.org/10.1177/030631289019003001>
- Suh, M., Youngblom, E., Terry, M., & Cai, C. J. (2021). AI as social glue: Uncovering the roles of deep generative AI during social music composition. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Article 582, pp. 1–11). Association for Computing Machinery. <https://doi.org/10.1145/3411764.3445219>
- Suno. (2025). *Suno*. <https://suno.com/>
- Taylor, M. (2012). *Musical theatre, realism and entertainment*. Ashgate.
- Vengathattil, S. (2025). Collaborative AI in music composition: Human–AI symbiosis in creative processes. *International Journal of Management Science and Information Technology*, 5(1), 253–262. <https://doi.org/10.35870/ijmsit.v5i1.4085>
- Wang, C. (2025, June). Beyond authorship: Human–AI collaboration and open creative processes in music [Conference paper]. *Journées d’Informatique Musicale 2025*, Lyon, France.

<https://hal.science/hal-05102298>

Yang, W., Shen, L., Huang, C.-F., Lee, J., & Zhao, X. (2024). Development status, frontier hotspots, and technical evaluations in the field of AI music composition since the 21st century: A systematic review. *IEEE Access*, 12, 89452–89466. <https://doi.org/10.1109/ACCESS.2024.3419050>